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Contact: Ramakrishna "Rama" Nemani, UM research associate professor, (406) 243-4326, nemani@ntsg.umt.edu

UM SCIENTIST USING NASA TECHNOLOGY TO HELP CALIFORNIA WINE MAKERS

MISSOULA —

Remote-sensing scientist Ramakrishna Nemani doesn't like wine, so it's ironic he's using cutting-edge NASA technology to help vineyards in California's Napa Valley grow better grapes.

Nemani works for The University of Montana's Numerical Terradynamic Simulation Group, which produces software to help NASA analyze remotely sensed data obtained from planes, satellites and more. It's Nemani's job to find practical applications that will put this new technology to work.

Enter Napa Valley's Robert Mondavi Winery, one of the largest wine producers in the United States. Winery officials there work to control the "vigor" of their vineyards. Vigor is agricultural-speak for the health of a plant, which results from the type and depth of soil the plant is in, the water it receives and the sunlight it gets.

For wine producers, vigor is not necessary a good thing. Vines that are too vigorous – characterized by dense foliage – will produce grapes that are too big and watery. On the other hand, a stressed vine with less foliage won't have the energy to produce a big crop.

Nemani said wine producers want vines with a medium vigor, which produces berries that are small and full of flavor. This correct vigor can lead to premium wines with higher

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price tags.

Europe always has maintained a slight advantage over the United States in the production of high-quality wines, since growers there have had generations of trial-and-error to tailor the perfect vigor for their vineyards. But Nemani believes that youthful Napa Valley's disadvantage can be erased with a little boost from NASA.

He said the Mondavi Winery is paying $1 an acre for aerial scans of its vineyards every two weeks. These digital images are taken by a plane flying at 10,000 feet that is equipped with a multi-spectral imager.

Nemani said this imagery data is then piped into UM computers, and software he helped design determines the canopy density of the vineyards below. A false-color image then clearly shows where vines are too vigorous or too stressed. This information is then relayed to the winery, where workers can cut back the thick foliage or irrigate stressed areas. The goal is to get a uniform "medium vigor" canopy density that will produce grapes for premium wines.

"Mondavi is trying to drive up its wine ratings and maintain consistency," Nemani said. "This type of information can really help profits. Even a $5 to $10 increase in bottle price is huge for them."

Nemani also uses canopy density data and other variables - such as the historical seasonal tendencies of Napa Valley, current weather conditions and the weather forecast - to predict how growers should tend their vineyards in coming days. He calls this biospheric forecasting, which hopefully will lead to better operational management decisions.

"Say you have a lawn and go on vacation for a week," Nemani said. "Using this type of forecasting you can set your sprinklers to automatically adjust to the weather."

NASA gave its multi-spectral imaging technology to a private company that does the Mondavi flyovers. Nemani said a weather station near the winery constantly keeps tabs on

current conditions, so the vineyards are constantly being monitored from his UM office.

Right now biospheric forecasting is being used only in the Napa Valley, but Nemani could see similar methods coming soon to Montana. He said such forecasting could help the state's wheat farmers or cherry growers in the Flathead Valley – basically any crop that can be micromanaged through irrigation or other methods.

Nemani and UM's NTSG spent 10 years designing software models that remotely sense canopy density and other variables. Their software works with data from sensors aboard NASA's Terra environmental satellite, which is taking complete scans of the Earth's vegetative cover about every two days.

"It took us 10 years of designing the software, but we are still only half way to our goal," Nemani said. "Now we have to transfer the technology so that real-world problems can be solved."

He said the day isn't too far off when macro-versions of biospheric forecasting can be brought to more of the nation's farmers. Future agriculturalists may be able to look at any crop and tell farmers the best way to irrigate while using the least possible resources.

Nemani said his efforts to help Napa Valley make better wine has been professionally rewarding, demonstrating how a NASA-funded project can have scientific merit and economic benefits. But when Mondavi sends him a bottle or two of the good stuff so he can personally experience the fruits of his labor, he usually gives them away. Personally, he's not a big wine drinker.

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